

REMARKS

Claims 1-8 are pending in the application. They stand rejected under 35 U.S.C. 103(a) as being unpatentable over Stivers et al. (EP 842980 A2) in view of Farnham et al. (US 5,134,211 A).

As mentioned in the October 27, 2005 response, Applicants' invention is a curable composition of a fluoroelastomer, a certain fluorinated polyether and a curing agent. The fluorinated polyether has an alcohol terminal group and a fluorinated allyl terminal group and is based on the repeating unit $\text{---}[\text{CF}_2\text{CFH-O-R}_f\text{-CF}_2\text{CH}_2\text{O}]_n\text{---}$. After extensive research, Applicants have surprisingly discovered that these polyethers are less fugitive (at high temperatures) from both fluorinated elastomers and perfluorinated elastomers than are perfluorinated polyethers or other fluorinated polyethers of the prior art. As shown in the Examples, the instant compositions have better low temperature properties (i.e. lower T_g and lower TR-10) than do similar compositions, absent the fluorinated polyether. Yet, unlike prior art (per)fluorinated polyethers, most of the polyether employed in Applicants' claimed invention remains in the fluoroelastomer compositions, even when the compositions are heat aged at 250°C for 168 hours or when exposed to jet fuel for 168 hours at room temperature (see weight change values reported in Tables III and IV, pages 16 & 17).

Descriptions of the Stivers et al. and Farnham et al. references are contained in Applicants' prior responses.

The examiner asserts that it would have been obvious at the time of Applicants' invention to replace the fluorinated polyether of Stivers (EP 0842980 A2) with that taught by Farnham et al. (US 5,134,211 A) in order to achieve Applicants' invention and its advantages. The examiner's argument for motivation to combine the two references seems to be based on his statement found in the last paragraph on page 4 of the August 9, 2005 non-final rejection, namely "...it is well known scientific principles, more C-H bonds in the fluorinated polyether makes more compatibility with fluoroelastomer because H atom is small to be compatible, it is therefore less fugitive."

Applicants respectfully traverse the rejection and disagree with the examiner's rationale for motivation to combine the two cited references.

Applicants are unaware of any scientific principle that states or suggests that because a H atom is small, the more C-H bonds in a polyether (vs. C-F bonds?), the more compatible such a polyether will be with a fluorinated elastomer polymer, and thus less fugitive at high

temperatures. To the best of Applicants' knowledge, steric effects of substituents on the C-C backbone of the polyether have no influence on the degree to which a polyether is fugitive from a fluoroelastomer composition at elevated temperatures. Does the examiner have a reference that he could cite?

Polyesters and polyethylene oxides also lower the Tg of fluoroelastomers. Polyesters and polyethylene oxides have still more C-H bonds per polymer chain than do the fluorinated polyethers employed in Applicants' invention. Yet polyesters and polyethylene oxides are not more compatible, less fugitive in fluoroelastomers than are the fluorinated polyethers employed in Applicants' claimed compositions.

Applicants had hypothesized that the reason for the improved compatibility of vinylidene fluoride containing fluoroelastomers with the fluorinated polyethers employed in Applicants' invention may be due to the high degree of polarization of the C-H bonds in the fluorinated polyether, thus facilitating polar-polar interactions between the polyether and the vinylidene fluoride containing fluoroelastomer and making the polyether less fugitive. However, this hypothesis does not explain why non-polar fluoroelastomers are also compatible with the highly polar fluorinated polyether employed in Applicants' invention. Example 6 of the instant application uses fluoroelastomer FE-2, a non-polar elastomer comprising copolymerized units of ethylene, tetrafluoroethylene and perfluoro(methyl vinyl ether).

For the sake of argument, even if the examiner is correct in the scientific principle that he states as a motivation for combining the teachings of Stivers et al. with those of Farnham et al., Applicants believe that such a motivation would lead to an "obvious to try" standard of patentability, rather than obviousness under 35 USC 103(a). Since at least some plasticizers having a plurality of small H atoms along their backbones, e.g. polyesters and polyethylene oxides, are much more fugitive from fluoroelastomers than is the fluorinated polyether employed in Applicants' invention, the result of using a plasticizer having small H atoms in a fluoroelastomer composition is not predictable.

Lastly, Applicants respectfully traverse the examiner's rejection under 35 U.S.C. 103(a) based on the above arguments and the indicia of long felt, but unsatisfied need for the invention. Fluoroelastomer articles (e.g. seals) that have good physical properties and seal well at both low temperatures and high temperatures (e.g. in car engines that will be exposed to winter climates) have been sought for years. The Stivers et al. patent application has a priority date of 1991. Farnham et al. has a priority date of 1990. Since 1991, others have

published (e.g. US 5681881) disclosures of fluoroelastomers blended with various fluorinated polyethers in an attempt to produce rubber articles which can perform well at both low and high temperatures. Perhaps because of the fugitive nature of most polyethers contained in fluoroelastomer compositions, others (e.g. US 20050192420 A1; US 6864336 B2, copies enclosed) have taken to making low Tg fluoroelastomers by copolymerizing into the fluoroelastomer a long chain (per)fluorovinyl ether monomer having multiple ether linkages. Yet no one, until Applicants, employed the particular polyether of Farnham et al. in a blend with fluorinated or perfluorinated elastomers to make articles that maintain good properties at both low and high temperatures with minimal loss of polyether from the articles when exposed to high temperatures.

In view of the above remarks, Applicants believe that claims 1-8 are patentable and that the application is in condition for allowance. Reconsideration is requested.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "George E. Kirvan, Jr.", written in a cursive style.

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